Infection Control in Health Care Facilities

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California Department of Health -Jan 2003

- Outbreak of > 20 cases of aspergillus in SICU
- At least 5 windows in the SICU were wide open to outside
- A helicopter landing pad < 300 ft. from SICU

Stats

Healthcare Acquired Infections

- 2 mil. infections lead to approx. 88,000 deaths/ yr
  - Failure to comply with existing protocols and procedures
  - Estimate 70% are due to lack of handwashing
  - Estimate 5% are related to construction, renovation and maintenance

- Cost for treating Healthcare Acquired Infection

HAI = $5 billion/yr

Stats

Hospital deaths from Fire

- Hospital deaths related to fire decreased over past 30 yrs from 28 to 4 / yr
  - Alcohol hand gels have raised concern regarding the flammable nature of these products
  - A controversy erupted regarding how to safely introduce waterless handwash products into the facility – now resolved

Weigh the Risk in Dollars . .

Regulations and Guidelines

- JCAHO
- AIA Guidelines for the Design and Construction of Hospital and Health Care Facilities (mandated by most state laws)
- State Licensure (in many states)
- CDC Guidelines on Environmental Infection Control
  - Part II - Recommendations published 6/6/03

JCAHO

- Sentinel Event Alert related to IC last year
- E.C. Standards - EC 8.30 in 2004
- Patient Safety Standards

JCAHO's Sentinel Event Alert –Jan 2003

- Emphasis that pt. death or permanent injury/loss of function as a result of HAI now meets criteria for "reviewable sentinel event".
- Each event should undergo a root cause analysis (RCA) to identify risk reduction strategies
- JCAHO recommends health care facilities comply with CDC's new hand hygiene guidelines.

EC 8.30 - effective in 2004

- The hospital manages the design and building of the environment when it is renovated, altered, or newly created

Dynamic Process NOT Static

CDC's "Guidelines for Environmental Infection Control"

- Best tool available
- What it covers
  - Air
  - water
  - environmental services
  - laundry and bedding
  - Animals in healthcare facilities
  - Regulated Medical Waste

AIA Guidelines

- 2001 Guidelines for Design and Construction of Hospitals and Health Care Facilities

  (currently being revised for 2006)
  - Chapter 5 – Planning and Design
    - All new construction and renovation
      - Consult from IC and Safety
      - Development of an Infection Control Risk Assessment (ICRA)
      - Documentation

Dynamic Process NOT Static

Construction, Demolition, Maintenance/Repair

- Proactive Risk Assessment
- Identify hazards that could potentially compromise patient care
- Address impact on:
  - Air quality, controlling infection, utility requirements, noise, vibration, and emergency procedures

Multi-disciplinary team review:

- Design and function of new or renovated area
- Risk assessment in preventing airborne & waterborne HAI
- Dust and moisture containment strategies
- Noise and vibration affect on patient care
- What contingency plans are in place for unexpected outages

High Risk Activities

- Disruption of settled dust
- Disruption of ceiling tiles
- Repair/renovation of elevator shafts
- Repair of under sink cabinets
- Pulling up carpeting
- Disturbance of “environmental reservoirs”

Noise and Vibration

- Recent heart attack
- Premature babies
- Recent intracranial bleed or stroke
- Psychiatric disorders
- Test effects:
  - EEG or EKG
  - Hearing assessments
  - Neurological studies
  - Microsurgery
  - Sleep studies

Knowledge IC brings

- Identify populations at risk
- Transmission routes
- Infectious agents
- Prevention strategies
- Assist with education
  - employees, patients, visitors and contractors

Individuals at Risk

- **Bone marrow transplant**
- Malignancy with leukemia/lymphoma
- Organ transplant
- HIV infection – end stage
- Cancer (solid tumor)
- Diabetes
- Steroid therapy
- Chronic obstructive pulmonary disease
- Healthy person

Reminder:

Hospital beds are not the only place where “at risk” people may be found

Clinics

Hallways

Lobby

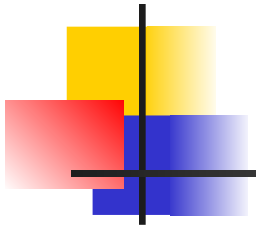
X-Ray

Cafeteria

Waiting rooms

Dialysis

Transmission Routes



- People
  - Droplets, respiratory secretions
- Aerosols
  - Nebulizers, humidifiers, showers, sprinklers, fountains, cooling towers
- Dust – disturbing or creating
  - Soil, dirt, decaying vegetation
  - Construction, maintenance, cleaning

Aspergillus

- Fungus found in most of our environment
  - Dirt, leaves, dust
- Spores
  - Survive for years
- Opportunistic
  - Healthy people contract if large enough dose
  - Immunocompromised at greatest risk
- Evidence related to construction & renovation transmission
- Dust = risk

Infection with Aspergillus

- Extremely hard to diagnose
- Must treat early to be successful
- Mortality ~ 80% in immunocompromised

Type of Construction Project Activity

- **TYPE A -** Inspection and Non-Invasive Activities
- **TYPE B -** Small scale, short duration activities which create minimal dust
- **TYPE C -** Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies
- **TYPE D -** Major demolition and construction projects

TYPE A

Inspection and Non-Invasive Activities

- Includes, but is not limited to:
  - removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet
  - painting (but not sanding)
  - wallcovering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.

TYPE B

Small scale, short duration activities which create minimal dust

- Includes, but is not limited to:
  - installation of telephone and computer cabling
  - access to chase spaces
  - cutting of walls or ceiling where dust migration can be controlled.

TYPE C

Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies

- Includes, but is not limited to:
  - sanding of walls for painting or wall covering
  - removal of floorcoverings, ceiling tiles and casework
  - new wall construction
  - minor duct work or electrical work above ceilings
  - major cabling activities
  - any activity which cannot be completed within a single workshift.

TYPE D

Major demolition and construction projects

- Includes, but is not limited to:
  - activities which require consecutive work shifts
  - requires heavy demolition or removal of a complete cabling system
  - new construction.

Pt Risk Groups

Low Risk	Medium Risk	High Risk	Highest Risk
▪Office areas	▪Cardiology ▪EKG ▪Endoscopy ▪Nuclear Medicine ▪Physical Therapy ▪Radiology/MRI ▪Respiratory Therapy	▪ CCU ▪ ER ▪ L & D ▪ Lab ▪ Newborn nursery ▪ Out-pt surgery ▪ Pediatrics ▪ Pharmacy ▪ PACU ▪ Surgical Units	▪ Any area caring for immune compromised pts ▪ Burn unit ▪ Cardiac Cath lab ▪ Central Sterile Supply ▪ ICU ▪ Medical Unit ▪ Negative pressure isolation rooms ▪ OR including C-section rooms

ICRA Matrix

Pt Risk Group	Type A	Type B	Type C	Type D
LOW	I	II	II	III/IV
MEDIUM	I	II	III	IV
HIGH	I	II	III/IV	IV
HIGHEST	II	III/IV	III/IV	IV

Description of Infection Control Precautions by Class

	During Construction Project	Upon Completion of Project
Class I	1. Execute work by methods to minimize raising dust from construction operations. 2. Immediately replace a ceiling tile displaced for visual inspection	
Class II	1. Provide active means to prevent airborne dust from dispersing into atmosphere. 2. Water mist work surfaces to control dust while cutting. 3. Seal unused doors with duct tape. 4. Block off and seal air vents. 5. Place dust mat at entrance and exit of work area 6. Remove or isolate HVAC system in areas where work is being performed.	1. Wipe work surfaces with disinfectant. 2. Contain construction waste before transport in tightly covered containers. 3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area. 4. Remove isolation of HVAC system in areas where work is being performed.

Description of Infection Control Precautions by Class

Class III

During Construction Project	Upon Completion of Project
1. Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system. 2. Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. 3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 4. Contain construction waste before transport in tightly covered containers. 5. Cover transport receptacles or	1. Do not remove barriers from work area until completed project is inspected by the owner's Safety Department and Infection Control Dept. and thoroughly cleaned by the owner's Environmental Services Department. 2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. 3. Vacuum work area with HEPA filtered vacuums. 4. Wet mop area with disinfectant. 5. Remove isolation of HVAC system in areas where work is being performed.

Description of Infection Control Precautions by Class

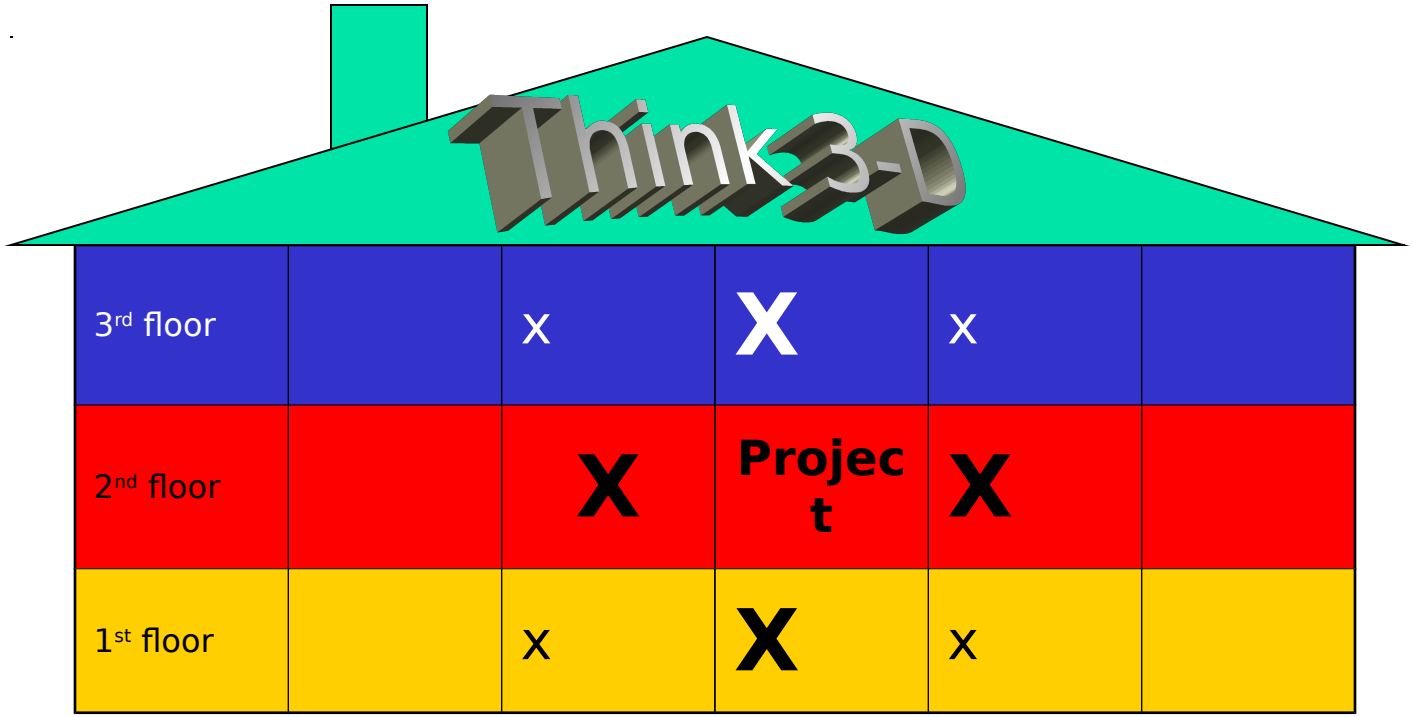
Class IV

During Construction Project	Upon Completion of Project
1. Isolate HVAC system in area where work is being done to prevent contamination of duct system. 2. Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. 3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 4. Seal holes, pipes, conduits, and punctures appropriately. 5. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site. 6. All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.	1. Remove barrier material carefully minimize spreading of dirt and debris associated with construction. 2. Contain construction waste before transport in tightly covered containers. 3. Cover transport receptacles or carts. Tape covering unless solid lid 4. Vacuum work area with HEPA filtered vacuums. 5. Wet mop area with disinfectant. 6. Remove isolation of HVAC system in areas where work is being performed.

Using ICRA Matrix

1. Identify type of Construction Project Activity
   - Type A through D
2. Identify the Patient Risk Groups that will be affected
   - Low, medium, high, highest
3. Determine Class of IC Precautions based on parameters
   - Levels I though IV

Assess surrounding areas



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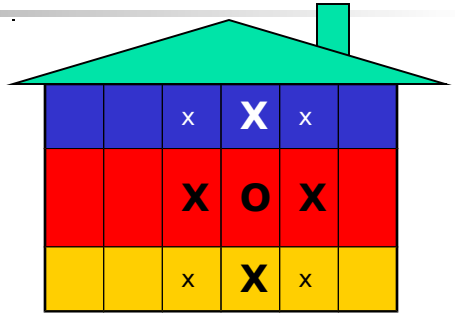
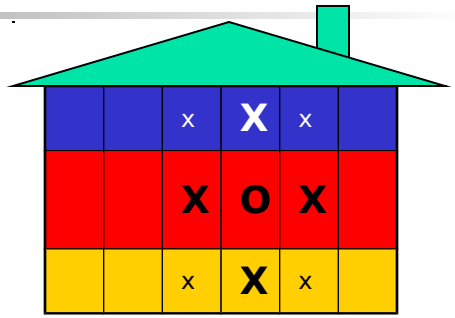


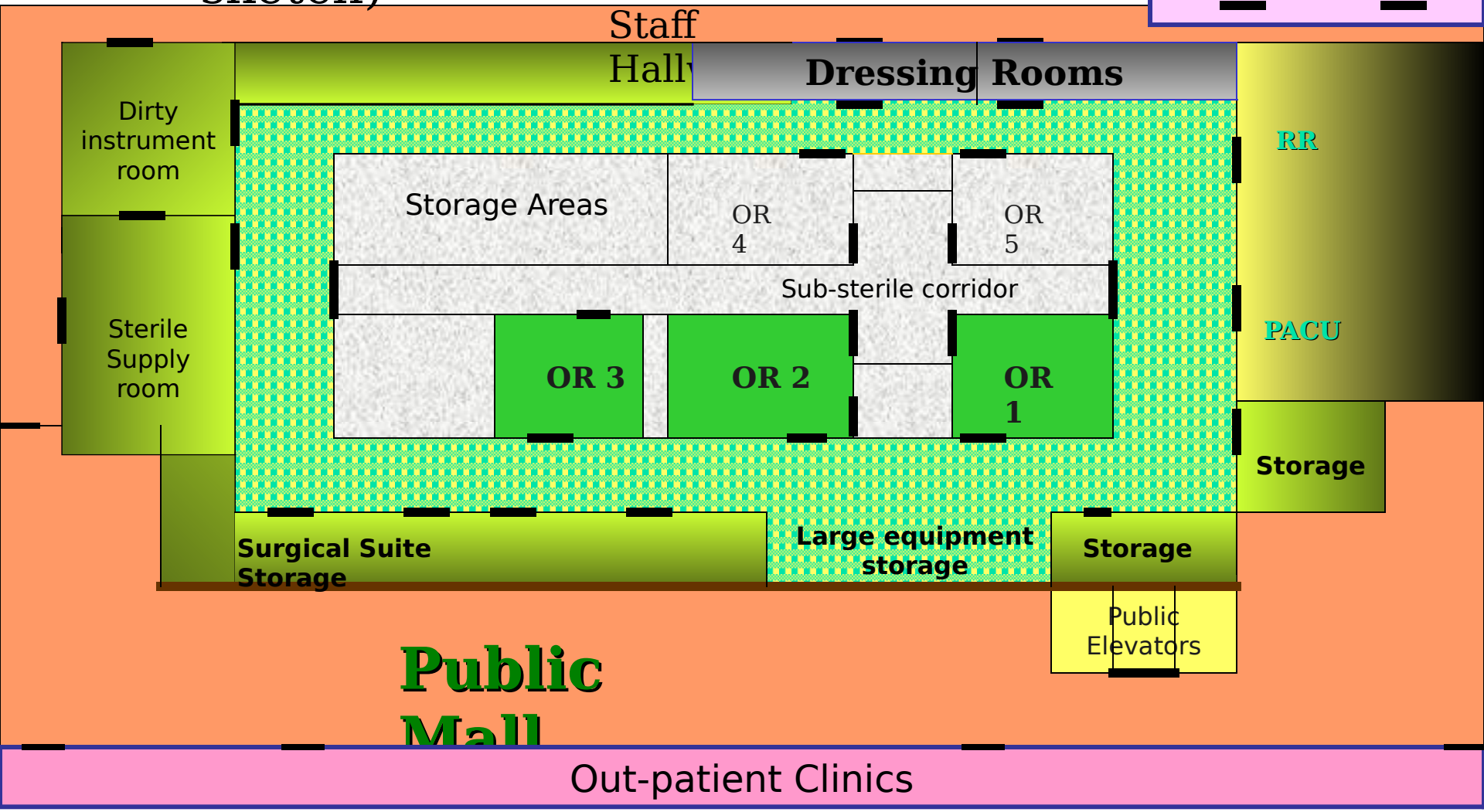
4. Potential impact
5. Specific site activity
6. Identify containment measures required
7. Issues related plumbing, electric, ventilation, possible outages
8. Consider potential risk of water damage
9. Work hours?

Assess surrounding areas



10. Adequate negative pressure or isolation rooms?
11. Adequate number and location of handwashing sinks
    - (check AIA guidelines)
12. Plan for clean and soiled utility rooms

Construction Zone (roug sketch)



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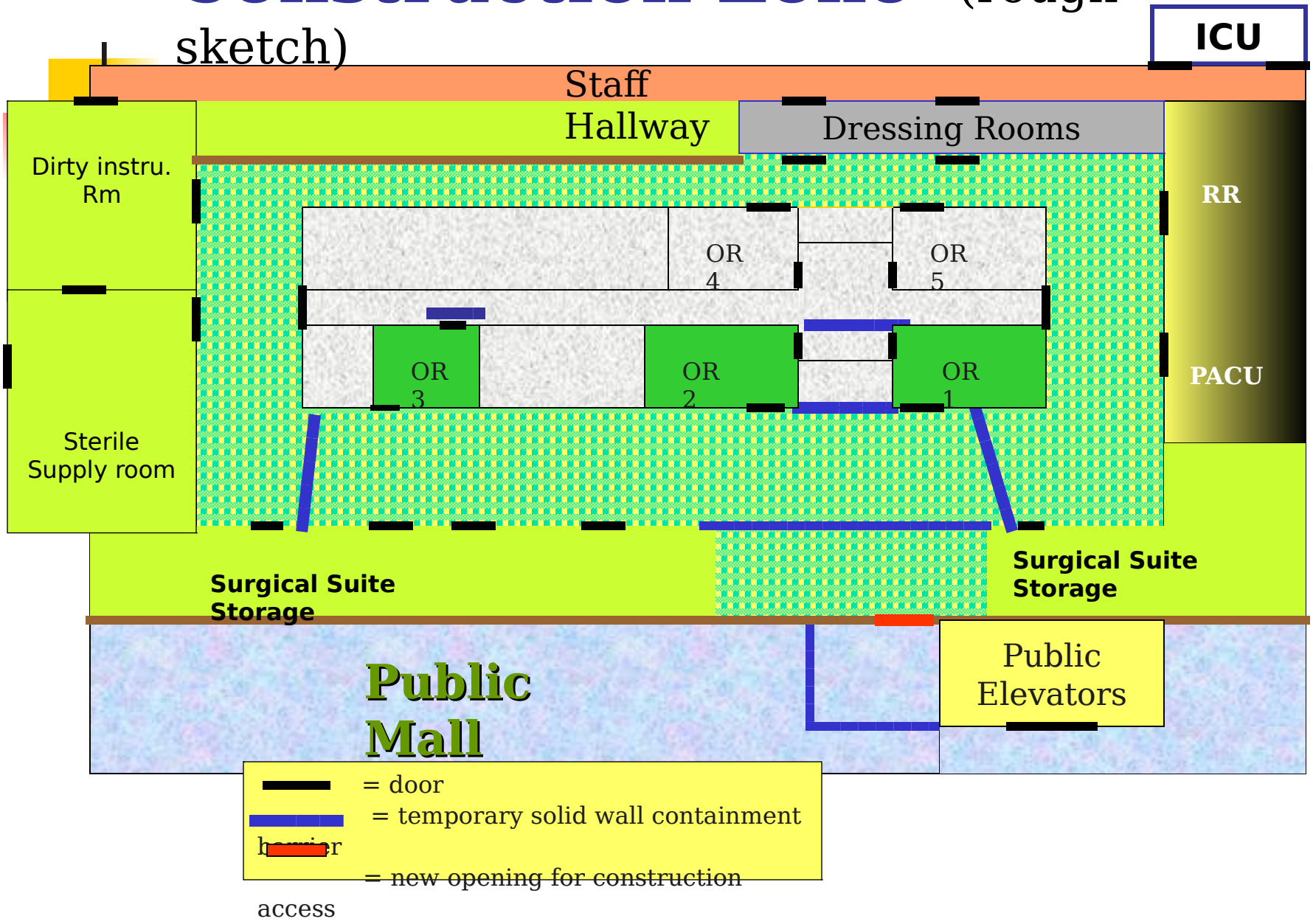
Construction Zone (rough sketch)



WERNER

Wolf Area
2G, 2H, 2J Rooms
2F Rooms
Bear Elevators

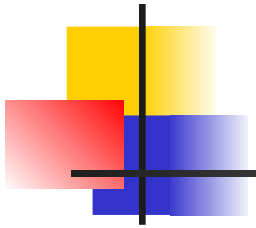
PLASTIC SHEETING

Our Challenge is What?

- Make a difference by changing our attitude regarding construction and maintenance
- Use the proper techniques even . . .

  when it is not the easiest thing to do
- Think it through before we begin a project

And most of all . . .



Save Lives ! ! !

QUESTIONS?

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